REMARKS

In response to the Office Action mailed 7 June 2007, the Applicants respectfully request the Examiner to reconsider the above-captioned application in view of the following comments.

Claims 19-26 and 28-35 were previously pending in this application. The Examiner has rejected all of these claims.

Response to Rejection of Claims under 35 U.S.C. §112

The Examiner has rejected all pending claims as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. In particular, the Examiner objects to the use of the term "inlet fan duct outer wall" in the claims as the Applicants have used it. The Examiner states that the Applicants fail to clearly redefine the term, which the Examiner states is required because of the usage made by the Applicants, which the Examiner suggests is contrary to its ordinary meaning. The Applicants traverse this rejection and note that (1) the Applicants have provided ample definition for the term, both in the text and figures of the application, and that (2) the Applicants' usage of the term is not contrary to the ordinary meaning, but rather consistent with the ordinary meaning of the term "outer wall".

Particularly, the Examiner has responded to the Applicants' previous arguments with respect to the term "outer wall" by noting that "the standard term for said element would be an inlet fan duct inner wall (with respect to the central axis of the engine)." (See office action, page 2, 3rd paragraph.) The Applicants note that the Examiner states that the wall in question is the "inner wall with respect to the central axis of the engine". However, the portion the Examiner is referring to is the inner wall of the casing of the engine. However, the casing of the engine forms the outer wall of the duct, which passes between the casing of the engine and the shaft of the engine.

While the usage by the Examiner could be made if the "duct" were understood to mean the physical structure that constrained the flow and formed the outer limit of the passage through core engine, the Applicants have defined the duct as the *passage* through

which the air flows, rather than the physical structures limiting the flow. With respect to the passage through which the flow travels, the wall in question represents the outer limit of the passage, and is therefore the "outer wall" of the "inlet fan duct".

This distinction is similar to the distinction normally made between a "duct" and the "ductwork" that defines the duct. In ventilation, "ductwork" or "ducting" is installed to provide a passage, or duct, through which air may flow. Air flows through the *duct*, but passes within limits of the space defined by the *ductwork*. The inner surface of the ductwork (the metal enclosure) defines the outer limit of the duct (the passage through which the air passes).

Consider what name to give to the surface disposed around the shaft that lies on the centerline of the engine. Because air does not flow through the shaft, and therefore the space inside the shaft cannot be part of the duct, it must therefore be the case that the outer surface of the shaft defines a limit to the passage, or duct. If the Examiner defines the surface the Applicants have labeled 22 as the "inner wall" of the duct, what wall of the duct does the surface of the shaft represent? This surface is closer to the centerline than the Examiner's "inner wall", and it still forms a limit to the passage through which the flow passes. Under the Applicants' nomenclature, this surface formed around the shaft is the "inner wall" of the inlet duct, which the surface 22 is the "outer wall".

This usage is not only self-consistent throughout the application, but is also well explained beginning at paragraph 0011 of the Applicants' specification. These descriptions not only clearly give a name and description of the identified portions, but also refer by reference number to the figures, making clear the physical relationship between the central axis, the duct, and the wall with respect to the duct. They therefore provide effective definition for the term as used within the claim, as well as providing the basis for the meaning of that term.

While the Applicants acknowledge that the Examiner's usage could be used by choosing different words for such surfaces as the surface that defines the inner limit of the duct, or by defining the term "duct" in such a way as to mean the walls of a passage rather than the passage itself, the usage made by the Applicants is self-consistent, consistent with

the meaning of the term "outer", and completely defined by the Applicants' specification. Therefore, the Applicants submit that the claim term is definite, and that the rejection by the Examiner of the claims under §112 is inappropriate. The Applicants respectfully request that the Examiner withdraw this rejection.

Response to Rejection of Claims under 35 U.S.C. §102 over Howell

The Examiner has rejected independent Claims 19 and 28, as well as Claims 21-26 and 30-35 which depend from Claims 19 and 28, as being anticipated by U.S. Patent Number 3,735,593 to Howell (hereinafter "Howell"). The Applicants disagree with this rejection, as will be discussed below, because all elements of the pending claims are not taught by Howell.

The Applicants have previously noted that the Examiner had reversed the upstream and downstream ends of the gas turbine engine shown in Howell, and that therefore, the limitations of the claim were not met by Howell. In particular, the Applicants' claim recited in part "the slot in the first end being disposed upstream of the fan rotor."

The Examiner has maintained the rejection, stating that "the claims as written lack a frame of reference that would allow Applicants' upstream/downstream definition to be distinguished from Howell's". (See Office Action, Page 2, 2nd paragraph.) The Examiner's statement misstates Howell's definition, as well as failing to recognize that upstream and downstream are readily distinguished in the Applicants' specification.

The Examiner attempts to characterize the difference in upstream and downstream directions as a distinction between how Howell defines them and how the Applicants define them. This is incorrect. Both Howell and the Applicants understand upstream to mean the direction that flow comes from, and downstream to mean the direction that flow moves towards. Using this definition, the flow comes into the front of an engine, and exits the back, establishing that the front is upstream of the back. Such definitions are consistent between the Applicants' and Howell's usage.

The definitions being the same, the only difference in the usage of upstream and downstream is that the Examiner has mislabeled Howell's downstream end as the

upstream end, and vice-versa in the previous office action. Although such a mistake is not carried over into the current office action, the Examiner has maintained his rejection, despite the fact that when upstream and downstream are properly applied to the figure shown in Howell (as discussed within the Howell reference itself, the upstream end of the engine is shown on the left, and the downstream end on the right of all of Howell's figures), it is clear that the elements recited in the Applicants' claims are not present. That is, the slot in the first end of the fluid duct is NOT disposed upstream of the fan rotor.

Furthermore, to suggest that an appropriate frame of reference is not available in the Applicants' specification is incorrect. The Applicants recite the operation of a jet engine in schematic form in paragraph 0011. This discussed the flow of air through the engine. By showing the path of the flow through the engine, the Applicants have identified what portions of this flow path are upstream or downstream of the other portions. Not only does this establish the necessary distinction between upstream and downstream directions at any given point within the engine, but such understanding of flow through a gas turbine engine is universally understood within the art; inlets must be upstream of their associated exhausts – if they weren't, they wouldn't be inlets.

The Examiner also states that "the operation of Howell's apparatus is not affected at all if the downstream region was to be called an upstream region". The Examiner is correct insofar as applying a *name* to a particular region does not affect the *operation* of the engine illustrated in Howell. However, such an observation is limited to the significance of the name alone. If the words "upstream" and "downstream" are considered to have their normal meanings, as both Howell and the Applicants clearly intend them to have, then the difference created by reversing the upstream and downstream directions is of critical importance. The operation of the apparatus shown in Howell would most definitely not operate in the same manner if upstream and downstream were to be reversed – the suggestion by the Examiner that flow could be reversed in an engine without changing the operation of it is simply incorrect.

If, rather than suggesting that the distinction between the definitions of upstream and downstream have no effect, the Examiner was simply suggesting that the distinction

between having the slot in the first end located upstream versus located downstream of the fan rotor has no effect, then the argument is merely inappropriate and inapplicable as raised. To suggest that the element recited in the claims is anticipated because *a different element* is found in the cited reference is improper under §102. Each recited element of the claim must be found within the scope of the cited reference. The Examiner has identified an opening in the fluid duct that is not located upstream of the fan rotor, and used it to anticipate a claim element that explicitly recites a slot disposed upstream of the fan rotor.

In light of the arguments presented above, the Applicants ask that the Examiner withdraw the rejection of the pending claims under §102 over the Howell reference, since all recited elements are not found within the cited reference.

Response to Rejection of Claims under 35 U.S.C. §102 over McBride

The Examiner has rejected independent Claims 19 and 28, as being anticipated by U.S. Patent Number 3,572,960 to McBride (hereinafter "McBride"). The Applicants disagree with this rejection, as will be discussed below, because all elements of the pending claims are not taught by McBride.

In particular, the Applicants note that Claims 19 and 28 recite in part "wherein said fluid duct has a first end with a slot therein opening to said inlet fan duct outer wall". This element is not taught by McBride. The Examiner has indicated a first end of the fluid duct in Figure 1 of McBride. However, this end does not have a slot opening to the inlet fan duct outer wall. The end of the fluid duct indicated by the Examiner, and described within the text of McBride, leads to a passage within the inlet guide vanes, and then vented from the trailing edges of these vanes. (See McBride, col 3, lines 14-23.) The fluid is passed from the duct into the hollow interior 36 of the inlet guide vanes 24, and then exhausted through the slots 38 at the trailing edge of these vanes. None of these locations represents "a slot ... opening to said inlet fan duct outer wall". The outer wall is clearly identified in the Applicants' specification, and the slots shown in McBride open to a different location.

Because this element is not shown or taught by McBride, the reference cannot anticipate the claims. Therefore the Applicants respectfully request that the Examiner withdraw the rejection of independent Claims 19 and 28 over McBride.

Response to Rejection of Claims under 35 U.S.C. §102 over Raffy

The Examiner has rejected independent Claims 19 and 28, as being anticipated by U.S. Patent Number 4,199,295 to Raffy et al. (hereinafter "Raffy"). The Applicants disagree with this rejection, as will be discussed below, because all elements of the pending claims are not taught by Raffy.

Specifically, the Applicants note that Claims 18 and 28 recite "a fluid duct for increasing air velocity adjacent to an inlet fan duct outer wall", and "a slot in the first end being disposed upstream of the fan rotor. Raffy does not teach a system that performs such an operation with such a structure. Raffy operates by taking a flow of air that is provided at a location adjacent to the fan rotor tip, and modulating its release via contoured openings attached to the fan blade tips to produce pressure fluctuations that are a "counter-noise" to the noise naturally radiated from the engine. Such a technique does not increase the air velocity adjacent to the inlet fan duct outer wall.

As noted above, and discussed in Raffy, although air is provided through the outer wall of the inlet, the release of the air happens via a series of contoured openings disposed upon a cylindrical screen 2 attached to the tips of the fan blades themselves. See Raffy, col. 3, lines 13-30. The fact that such apertures are not only not located on a cylindrical screen fixed to the fan blades means that any such slot is not disposed upstream of the fan rotor, but rather *on* the fan rotor. Therefore, structurally, Raffy does not teach the recited elements of the Applicants' recited independent claims.

Furthermore, as discussed in Raffy, particularly in Column 1, lines 40-52, Raffy uses these slots to regulate the injected fluid so that "the acoustic waves generated by the injected fluid are substantially opposed to the phase of those of the noise to be reduced." Such a technique is based on the principle of producing a counter-noise to the noise naturally radiated from the fan rotor. This technique does not rely upon increasing the

velocity of the air near the inlet duct wall, and no such discussion of the velocity near the wall is made anywhere in Raffy.

Furthermore, the technique described in Raffy, producing counter-tones to the radiated noise, falls into the category of what is known as a "tuned resonator". Such techniques are fundamentally different that that described and claimed by the Applicants, as indicated by the reference in paragraph 0004 of the Applicants specification that note that "Tuned resonators ... are another noise control technique to reduce the level of discrete tones radiated outside the engine." Although Raffy may teach features with further advantages over an ordinary tuned resonator, Raffy none-the-less represents a prior art practice distinct from that claimed by the Applicants.

Because all recited elements of Claims 19 and 28 are not taught or suggested by Raffy, the rejection of these claims under §102 is inappropriate. The Applicants respectfully request that the Examiner withdraw this rejection from these claims.

Response to Rejection of Claims under 35 U.S.C. §102 over Antoine

The Examiner has rejected independent Claims 19 and 28, as being anticipated by U.S. Patent Number 6,546,734 to Antoine et al. (hereinafter "Antoine"). The Applicants disagree with this rejection, as will be discussed below, because all elements of the pending claims are not taught by Antoine.

Claims 19 and 28 recite, in part "a fluid duct or increasing air velocity adjacent to an inlet fan duct outer wall" and "wherein said fluid duct has a first end with a slot therein". As will be discussed below, neither of these elements are taught by Antoine.

As can be seen from Figure 1 of Antoine and described in Column 3, lines 4-11, a series of apertures 11 allow for the discrete injection of air at a number of points along the circumference of the lip of the inlet to an engine. These apertures 11 are mounted upon a movable ring 10 that allows for the radial position of these apertures to be collectively varied with respect to the remainder of the engine. These apertures are not a slot, as recited in the Applicants' independent claims. Because Antoine teaches the use of a series

of discrete apertures, rather than a slot, Claims 19 and 28 cannot be anticipated by the cited reference.

Although Antoine does recite a "slot", indicated by reference number 9, this slot is disposed inside the fluid duct and is the connection between the collector 8 (a part of the duct), and the space inside the annular ring 10. This slot does not open to the inlet duct outer wall, and so cannot anticipate the recited element of Claims 19 and 28.

Furthermore, similar to what is discussed above with respect to Raffy, the system taught by Antoine does not increase the air velocity adjacent to the inlet duct outer wall. Raffy states (Column 2, lines 16-24) that a "means for injecting a fluid into said flow channel through said orifices to form continuous jets of said fluid upstream of said ring of rotor blades" results in "sound waves generated by interaction between said jets of fluid and said moving rotor blades ... of substantially opposite phase to sound waves generated by interaction between said moving rotor blades and said fixed stator vanes." This makes clear that the technique being used to attenuate noise is to produce counter-noise that is out-of-phase with the noise generated by the rotor/stator interaction. Such techniques are entirely different from that described by the Applicants that increase the speed of the flow near the inlet duct walls, as recited in the Applicants' claims.

Because these elements are not taught by Antoine, Antoine cannot anticipate all of the recited elements of Claims 19 and 28. Therefore, the Applicants respectfully request that the Examiner withdraw the rejection of Claims 19 and 28 over Antoine.

Response to Rejection under §103 in view of Howell

The Examiner has rejected Claims 20 and 29 as being unpatentable over Howell under 35 U.S.C. §103(a). Claims 20 and 29 depend from independent claims 19 and 28, respectively. As discussed above, these independent claims recite elements not found in or suggested by Howell. Therefore Claims 20 and 29, which include all of the limitations of their respective independent claims, recite elements not found in Howell. The Applicants therefore submit that Claims 20 and 29 are patentable over Howell on the basis of the patentability of the independent claims from which they depend.

Conclusion

In light of the discussion above, the Applicants request that the Examiner reconsider the rejection of currently pending Claims 19-26 and 28-35 and pass these Claims to allowance. If any issues remain unresolved, particularly issues related to the Applicants, the Examiner is invited to telephone the Applicant's counsel at the number provided below so that a resolution can be most effectively reached.

Respectfully submitted,

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